# CHAPTER 8

## Eating for Performance and Health:

# The Nutrition Connection


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Are you eating the right foods to fuel your fast-paced, high-performance life-style? Every day is a race against the clock to accomplish countless tasks at work and home, within the community, and with family and friends. There is little time for anything else, including healthy eating! Your hectic lifestyle places strenuous demands on you. This chapter provides you with practical advice on how to eat to improve performance and health.

## EATING BASICS FOR MAXIMUM PERFORMANCE

What and when you eat can significantly affect how you feel, thus impacting your performance. There are three eating basics you must practice to fuel your body and mind for success:

- **Eat a variety of foods.** Your body needs more than 40 different nutrients daily.

Eating the same foods meal after meal and day after day increases the chance that you are not getting the right mix of nutrients for maximal performance. There is no one magic food that fuels your body because each food provides different nutrients in varying quantities.

- **Balance the foods you eat over several days.** In your hectic life, it may not be realistic to eat healthfully every single day. Be sensible and consider eating healthfully most of the time. For weight control, it is important to balance your caloric intake with your physical activity. To maintain weight, eat only the calories your body requires.

- **Eat and enjoy all foods in moderation.** All foods can be part of a healthy diet. The secret is not to indulge in high-calorie foods too often or in super-size portions. Super-size portions can lead to super-size weight gain, especially if you are not balancing your caloric intake with your caloric expenditure.

### WHAT'S IN A FOOD?

The key to successful, high-energy performance is to prevent excessive hunger. Eating at least three meals during your grueling day fuels working muscles, to include your brain. Additionally, it is absolutely critical to fuel your body with the right nutrients. There are six classes of nutrients that perform or assist with specific bodily functions, cumulatively comprising a vital factor in maintaining your performance and health. They are carbohydrates, protein, fat, water, vitamins, and minerals. Each nutrient is discussed in detail.

**Carbohydrates: Your #1 Performance Nutrient.** Carbohydrates are super fuel. They are your most important nutrient for achieving and maintaining maximal performance and stamina. Carbohydrates are either simple or complex and are found in greatest amounts in fruits, vegetables, and grains. Simple carbohydrates, also called simple sugars, include honey, table sugar, molasses, and foods containing added sugars such as non-diet sodas, desserts, and candy. Since simple sugars supply the most basic form of carbohydrates, they require very little digestion. Once consumed, they enter the bloodstream immediately and circulate as blood sugar, supplying you with energy to fuel both your body and your brain.

Complex carbohydrates, or starches, include fruits, vegetables, rice, pasta, potatoes, breads, cereals, and other grains. During digestion, they are broken down into glucose, a simple sugar. This process requires a few hours, which is why complex carbohydrates are not available for immediate energy like simple carbohydrates. Once broken down, the glucose units move throughout the body and are either used instantly or stored for later use.

The storage form of carbohydrate is glycogen. A typical 150-pound man stores about 1,800 calories in the form of glycogen. Table 1 lists glycogen storage sites, the approximate caloric content of the stored glycogen, and the corresponding purpose[1].

| Storage Site | Calories | Purpose |
|---|---|---|
| Muscle | 1,400 | Fuel muscles |
| Liver | 320 | Fuel muscles & brain |
| Blood | 80 | Fuel brain |

**Table 1.**

Carbohydrates play a critical role in fueling both muscle and brain power. In fact, your brain uses only carbohydrates for energy. When you deplete your carbohydrate stores, you may feel fatigued, light-headed, and unable to concentrate as effectively, or you may lose motivation to continue a mental or physical activity. A similar reaction may occur when you skip breakfast and lunch. To maximize your performance during hectic, mind-stressing days, 50-60% of your caloric intake should come from carbohydrate-containing foods. A few days of little or no carbohydrates can deplete glycogen stores, ultimately degrading your physical and mental performance.

Carbohydrates have been the center of controversy for several years. Supporters of low-carbohydrate diets claim that carbohydrates are converted to fat and cause weight gain. This claim is unwarranted. Carbohydrates have four calories per gram and are not stored as body fat unless you eat more total calories than your body requires. We shall return to this subject later.

**Protein: The Building Block for Winning Performance.** Protein is found in every cell of your body for building and repairing muscles and tissues, making hormones and chemicals for your body and brain, and supplying energy. Therefore, protein is needed every day, throughout the day, to maintain top performance. Protein differs from carbohydrates in that it cannot be stored for later use. After eating protein-containing foods such as meat, fish, milk, dry beans, nuts, or eggs, your body breaks them down into component parts called amino acids. These amino acids enter your bloodstream and are used immediately.

If you do not eat enough carbohydrates to maintain your glycogen stores or if you do not consume enough calories, your body will use amino acids (protein) for fuel.[2] However, this process is used only as an emergency back-up to supply energy to working muscles and your brain. The drawback is that critical amino acids are shunted away from their primary roles, which can lead to diminished performance and a weakened immune system susceptible to colds and other viruses.

*Are you eating enough protein to power your performance?* Table 2 lists recommended protein needs for individuals by activity level. [3]

| Status and Activity Level | Grams of Protein Per Pound of Body Weight |
|---|---|
| Sedentary Adult | 0.36 |
| Recreational Exerciser, Adult | 0.5 – 0.75 |
| Competitive Athlete, Adult | 0.6 – 0.9 |
| Growing Teenage Athlete | 0.8 – 0.9 |
| Adult Building Muscle Mass | 0.7 – 0.9 |
| Athlete Restricting Calories | 0.8 – 0.9 |
| Maximum usable amount for adults | 0.9 |

## Table 2.

Based on these categories, you can calculate your protein requirements according to the example in the box below:

Example: A 170-pound person who competes in marathons (i.e. competitive adult athlete) needs 102-153 grams of protein/day:

170 X 0.6 = 102 grams minimum

170 X 0.9 = 153 grams maximum

A 170-pound recreational exerciser who exercises 3-5 times/week needs 85-128 grams a day:

170 X 0.5 = 85 grams minimum

170 X .75 = 128 grams maximum

In a survey conducted by the Military Family Institute, 15% of each age group surveyed, including military and civilian, do not exercise[4]. Yet, many Americans consume 1½ to 2 times the Recommended Dietary Allowance (RDA) for protein, which is 0.36 grams per pound of body weight. Busy schedules often lead people to snack on carbohydrates throughout the day with little or no protein consumed until the evening meal. Saving your protein intake for the end of the day may actually induce drowsiness, especially if you limit your food intake primarily to carbohydrates during the day. The neurotransmitter responsible for a drowsy feeling is serotonin, which is produced when you eat carbohydrate-rich foods such as pasta, bread, cereal, pretzels, and popcorn. On the other hand, the neurotransmitters norepinephrine and dopamine produce an energizing effect that helps increase your alertness and motivation. Tyrosine is the amino acid protein that produces these substances. Your best sources of tyrosine are low-fat protein-containing foods such as lean chicken, beef, or turkey, dry beans, tofu, peanut butter, milk, and yogurt. See below.

**Food Protein amount) in (grams)**

1 cup milk/yogurt = 8 grams of protein

3 oz meat/fish = 21-25 grams of protein

2 tbsp peanut butter = 8 grams of protein

2 eggs = 14 grams of protein

½ cup dry beans = 7 grams of protein

¼ cake tofu = 10 grams of protein

¼ cup powdered milk = 11 grams of protein

To minimize carbohydrates' potential drowsy effects and achieve peak physical and mental performance, consume both protein- and carbohydrate-containing foods for meals and snacks. Contrary to popular belief, eating excess protein does not improve performance, build bigger and stronger muscles, or aid in weight loss. In fact, whether it is from food or supplements, excess protein can be harmful. Urea, a by-product of protein break-down, can reach dangerous levels in the bloodstream if it is not excreted. To prevent urea toxicity, your kidneys have to work harder to filter blood and generate more urine for excretion. Ingestion of excessive quantities of protein over time can potentially trigger kidney complications due to the extra stress placed on them.

Like carbohydrate, protein has four calories per gram. Ten to 15% of your calories should come from protein. For a typical

healthy person, eating four to seven ounces of protein-rich food daily is usually enough to satisfy protein requirements. When you eat more protein than what you need, your body stores the excess as fat, not muscle.

**Fat: An Essential Flavor Nutrient.** Fat is a nutrient often misunderstood and shunned, yet likely over-consumed despite our fat-phobic culture. However, in spite of its bad reputation, fat is needed for many functions such as meeting essential nutritional requirements, providing insulation and protection for vital organs, and providing energy for both low-intensity activity and exercise lasting more than 30 minutes.

For top performance and health, 20 to 30% of your calories should come from fat. Unfortunately, many Americans consume more than this amount, which can lead to obesity, heart disease, and certain cancers. In addition, too much fat may mean that you are not fueling your body with other high-energy nutrients like carbohydrates, protein, and essential vitamins and minerals. Not only can a high-fat diet jeopardize your health, it can also pack on the pounds because fat is calorie-rich. Fat has nine calories per gram, more than twice as many calories as carbohydrates and protein. Choosing lower-fat versions of some foods may reduce your caloric intake, assuming that you do not increase the portion size. In addition, your body easily stores excess fat calories as body fat, whereas you are more likely to burn off excess carbohydrate calories.

*How much fat is enough?* A typical 150-pound man stores 1,800 calories in the form of carbohydrates. This same person stores 60,000 to 100,000 calories as fat—enough energy to fuel several marathon workdays. Table 4 recapitulates the calorie content and recommended dietary percentages for carbohydrates, protein, and fat.

| Nutrient | Calories per Gram | Recommended Percentage in Diet |
|---|---|---|
| Carbohydrate | 4 | 50-60% |
| Protein | 4 | 10-15% |
| Fat | 9 | 20-30% |

**Table 4.**

The amount of fat to eat depends on your daily caloric intake. For example, if you eat 2,000 calories a day, then you should eat from 400 (20% of 2,000) to 600 (30% of 2,000) fat calories per day. Assuming you are using the upper range of 600 fat calories per day, the method for calculating the corresponding number of fat grams is shown in the box below. Later, we shall discuss how to calculate daily caloric requirements.

2,000 calories x .30 (30%) = 600 calories from fat

Divide calories from fat by 9 since 1 gram of fat has 9 calories.

600 calories ÷ 9 calories per gram = 67 grams of fat for a 2,000-calorie diet containing 30% fat

**Water: Your #1 Fluid Choice.** Water is a critical nutrient that your body relies on daily. In fact, you cannot live without water for more than 3 to 4 days. Fifty to 65% of your body is made up of water; therefore, water plays an important role in most human physiological activities. Water carries nutrients to working cells and muscles, transports waste products out of your body in the form of urine, lubricates your joints, and helps maintain your body temperature. Feeling tired, headachy, and dizzy, and lacking your usual concentration and motivation, can indicate dehydration.

If you fuel your day with caffeinated beverages, breathe dry air-conditioned or heated air at work, or perform exercise during the day, you are at risk for dehydration. To rev up your concentration and motivation, drink at least eight to ten 8-ounce glasses of water every day. Your brain is 75% water; therefore, even moderate dehydration can degrade brainpower. Yet another good reason to drink up is that men who drink six or more cups of water a day have half the risk of getting bladder cancer compared to men who drink less than one cup a day.[5] The good news is that your fluid intake does not have to be limited to water. Juice, milk, soup, and other non-caffeinated beverages count toward your total fluid intake. You may not want to include caffeinated beverages as part of your fluid intake because caffeine acts like a diuretic, which works to rid

your body of crucial water. To maintain adequate hydration, consider drinking a glass of water for every one to two cups of caffeine-containing beverages consumed.

*How do you know if you are adequately hydrated?* Your urine should be pale yellow or clear in color. Dark, concentrated urine with a strong smell is a clue that you need to drink water. Some vitamin and mineral supplements can color your urine also. Other signs of dehydration include thirst, dizziness, fatigue, flushed skin, headache, loss of appetite, and weakness.

Begin your day with 8 to 16 ounces of water and replenish your body and brain with water often throughout the day. When exercising or traveling, you need even more than the recommended eight to ten glasses a day. For a successful, high-energy day, follow the recommendations in Table 5 below.

| | |
|---|---|
| **Less Active** | Drink 8 – 10 cups a day(1 cup = 8 oz) |
| **More Active** | Drink at least 10 – 12 cups a day |
| **Before Exercise** | Drink at least 16 oz |
| **During Exercise** | Drink 4 – 8 oz every 15 to 20 minutes |
| **After Exercise** | Drink at least 24 oz or 1 – 2 cups for every pound lost during exercise |

## Table 5.

**Vitamins and Minerals: Your Sparkplugs for Performance.** People who take a vitamin or mineral supplement instead of eating breakfast to energize their day are doing little to enhance energy levels. The reason is that energy is obtained from calories, which vitamin or mineral supplements do not provide. A vitamin or mineral capsule does, however, provide you with other important nutrients that may be lacking as a result of your less-than-perfect eating habits. Vitamins regulate all body processes, such as bone growth and maintenance of healthy skin. Without them, your body would not be able to activate carbohydrate, fat, and protein for energy. Minerals assist in regulating water balance and providing structure to bones and teeth.

Although vitamins and minerals do not directly provide energy in the form of calories, they play an extremely important role in generating energy for everything you do. Vitamins and minerals are like sparkplugs in your car's engine; you cannot get started without them. However, a common misconception is that the more vitamins and minerals you take, the more energy produced. This is not true as there is a very limited amount needed for this role. If through food or supplementation, you consume more vitamins or minerals than you need, the kidneys excrete the excess, except for fat-soluble vitamins A, D, E, and K.

Although you cannot live without vitamins and minerals, most people get enough through a variety of nutrient-dense foods. Table 6 shows 10 specific food amounts comprising a 1,200-calorie diet that together would provide most people with 100% of the RDA for each vitamin.

There are some situations, that may increase your vitamin or mineral requirements. Healthy people who may benefit from vitamin or mineral supplements are:

- Women with heavy menstrual flow
- Pregnant or breast-feeding women
- Menopausal women
- Individuals on low calorie diets (less than 1,200 calories/day)
- Vegetarians
- Individuals with limited milk intake
- Anyone who is unable or unwilling to consume a healthy diet regularly

If you feel that you may benefit from vitamin or mineral supplementation, it is best to discuss this with your doctor or registered dietitian.

| Ten Foods Providing at Least 100% of the RDA for Each Vitamin |
| --- |
| 2 cups fortified milk |
| 3 oz chicken breast |
| 3 oz tuna fish canned in water |
| 1 medium carrot |
| 1 stalk broccoli |
| 1 orange |
| 1 tbsp margarine |
| ½ cup cauliflower |
| 4 slices wheat bread |
| 2 oz cereal |

**Table 6.**

**THE FOOD PYRAMID: YOUR GUIDE TO PERFORMANCE EATING**

Shown below in Figure 1 is the Food Pyramid. Use the Pyramid as your personal nutrition guide to help you eat a balanced diet that will not only fuel your body and mind, but also add years to your life. Eating the minimum recommended servings from each food group provides approximately 1,600 calories a day, while eating the maximum servings provides 2,800 calories. A confusing concept about the Food Pyramid is the serving size. We live in a world of super-sizes and mega-deals in which *actual* food servings are often three to four times the serving size employed by the U.S. Department of Agriculture (USDA) in designing the Food Pyramid. Table 7 below shows what several typical food units or portions available in home and restaurant are actually equivalent to in terms of Pyramid servings. See Appendix A for a list of Pyramid serving sizes for all food groups.

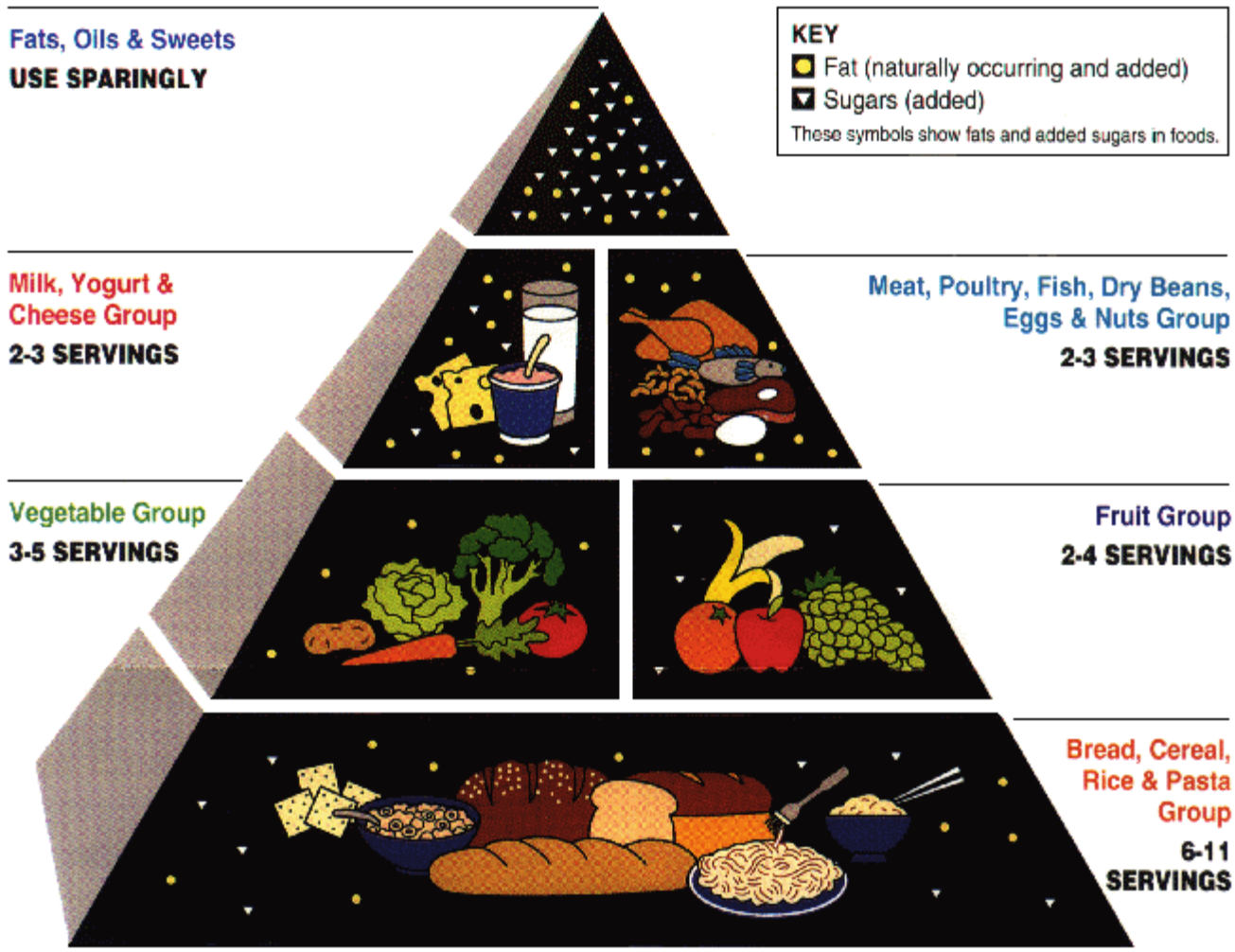


**Figure 1. The Food Pyramid**

This group forms the foundation of the Pyramid and thus the foundation of a healthy diet. Foods in this group provide high-energy complex carbohydrates and beneficial vitamins, minerals, and fiber, especially if the food is whole-grain. Foods from this group are generally low in fat, unless you add butter, margarine, oil, or other fats to them. To obtain high-energy, nutrient-packed carbohydrates, make sure that at least half of the foods consumed from this group are whole-grain or whole-wheat (fiber is discussed later).

It is easy for people with hectic schedules to munch through the day on carbohydrates while missing out on other nutrients. *Here are tips for eating adequate complex carbohydrates each day:*

- Eat 1 to 2 cups of whole-grain cereal for breakfast or for a mid-morning snack.
- Eat half of a large bagel or super-sized muffin and save the other half for later or share with a friend.
- Make a sandwich from whole-grain bread, such as whole wheat or pita bread.
- Snack on a serving of whole-grain crackers like Triscuits.
- Read nutrition labels for the serving size and eat 1 or 2 servings, not 3 to 5 servings.
- Stop yourself from eating the entire bag of pretzels or popcorn during the day.
- Remove 1 or 2 servings, put the bag away, and eat other foods to fuel your day.

| Food Unit | Number of Pyramid Servings |
|---|---|
| 1 deli bagel | 4 – 5 |
| 1 restaurant portion of spaghetti | 4 – 6 |
| 1 large sub roll | 3 – 4 |
| 1 hamburger bun | 2 |
| 1 typical bowl of cereal | 2 - 3 |

## Table 7.

**Fruits and Vegetables.** The fruit and vegetable groups are on the next layer of the pyramid. For optimal health and disease prevention, the National Cancer Institute and the USDA recommend that everyone eat at least five servings of fruits and/or vegetables a day. Yet, the Centers for Disease Control and Prevention (CDC) report that only 27% of women and 19% of men eat five or more servings daily.

Fruits and vegetables are packed with disease-fighting phytochemicals, vitamins, minerals, carbohydrates, and fiber. Phytochemicals are naturally-occurring substances, such as lycopene, carotenoids, and isoflavones that are found in plants. Their exact role in health promotion is uncertain; however, certain phytochemicals may help protect against some cancers, heart disease, and other chronic conditions. Another benefit of fruits and vegetables is that most of them do not contain fat unless it is added, and are lowest in calories when compared to other foods.

The number one change that most people can make in their eating habits is to consume more fruits and vegetables. *Here are tips to help you consume at least five servings a day:*

- Eat fruit or drink fruit juice with breakfast or snacks.
- Keep a stash of juice boxes, dried fruit, and canned fruit at work, in your suitcase, or in the car.
- Drink a fruit smoothie made from fresh fruit.
- Eat 1 to 2 servings of vegetables with your lunch. Bring fresh vegetables or order a side salad instead of fries with your sandwich.
- Eat your vegetables alone or, for added flavor, eat vegetables with low-fat dip or salad dressing. Eating vegetables with a little fat is better than eating none at all.
- Stock frozen vegetables at home. Microwave or steam them for a few minutes, and mix with pasta, toss with salad, or eat plain.
- Add vegetables to canned soups, pizza, or leftover pasta dishes.
- To save time, buy ready-to-eat fruits and vegetables.

**Milk, Yogurt, and Cheese.** Dairy products comprise the third layer of the pyramid. Dairy foods provide you with a good source of protein and are some of the best sources of calcium and vitamins A and D. These foods can be high in fat and calories, however, so choose low-fat or fat-free dairy products more often. For the alarming decline in milk consumption by teenagers, see box to the right. [6]

Consuming enough dairy products, at least two to three servings daily, is your strongest safeguard against weak bones and the risk of bone fractures associated with osteoporosis. This is especially important for women who are going through or

have been through menopause. *Here is how to sneak low-fat dairy products into your hectic day:*

- Eat cereal and milk with breakfast. Stock these foods at the office.
- Prepare oatmeal with milk instead of water.
- Eat low-fat yogurt with lunch or snacks. Add fruit, jams, jellies, or cereal to plain yogurt to create tasty flavors and textures.
- Drink calcium-fortified juice. Stash juice boxes at the office, in the car, or in your suitcase.
- Eat calcium-fortified cottage cheese.
- Eat low-fat cheese and crackers; string cheese travels well.
- Drink low-fat or skim milk with meals or snacks.
- Drink chocolate milk if you do not like the taste of white milk.
- Drink hot cocoa made with milk instead of water.

**Milk & Soda Consumption**

1970's: Teenagers drank twice as much milk as soda.
1990's: Teenagers drank twice as much soda as milk.
An average teenage girl gets 40% less calcium than she needs.

If you experience abdominal pain, bloating, nausea, cramping, or diarrhea after consuming dairy products, you may be lactose-intolerant. This is a condition in which your body cannot break down lactose (milk sugar) into small digestible parts. If you experience one or more of these symptoms after consumption of dairy products, see your doctor for a medical diagnosis.

Many people who are lactose-intolerant can consume lactose-containing foods. The key is knowing which foods contain lactose and how much lactose you can tolerate without experiencing an adverse reaction. Appendix B provides a list of lactose-containing foods and their amounts of lactose. *Here are some tips for lactose-intolerance individuals*:

- Drink lactose-reduced or lactose-free milk and other dairy products.
- Add lactase enzymes to milk before drinking it.
- Experiment with small amounts of lactose-containing food.
- Increase portion gradually to test your tolerance.
- Eat lactose-containing foods as part of a meal and not alone.
- Eat smaller, more frequent portions of lactose-rich foods.
- Try dairy foods made with active cultures (yogurt/buttermilk).
- Choose calcium-rich foods that are naturally lower in lactose (swiss, colby, parmesan, and cheddar cheese).

**Meat, Poultry, Fish, Dry Beans, Eggs, and Nuts.** The Food Pyramid's second food group found on the third layer consists of meat, chicken, turkey, pork, fish, seafood, wild game, dry beans, eggs, tofu, peanut butter, and nuts. In addition to providing protein, foods in this group also supply varying amounts of iron, zinc, and B vitamins—all of which are important to keep your body functioning at its maximum potential.

Darker-colored animal meats like beef, liver, and dark poultry meat are especially good sources of iron, the mineral that helps carry oxygen to working cells. If you are anemic or have insufficient iron, cells do not have as much oxygen as they should, and you may feel sluggish and tired. Eating enough iron-rich food is critical to brainpower since the brain requires the highest level of iron and oxygen of any organ. See Appendix C for a list of iron-rich foods.

Dry beans, also called legumes and lentils, are plant sources of protein and include kidney, pinto, navy, and soybeans. In addition to protein, these foods supply complex carbohydrates, fiber, and disease-fighting phytochemicals. They are also cholesterol-free and nearly fat-free. Nuts and peanut butter are excellent protein sources too, but they are higher in calories and fat—mostly heart-healthy unsaturated fat—so consume them in moderation. *Here are some practical tips for consuming your daily protein quota:*

- Limit your meat portion per meal to no more than 3 ounces, which is the size of a deck of cards.
- To distribute protein intake throughout the day, consider eating a small to moderate portion of protein-containing food with most or all of your meals and snacks.
- Toss a salad with chunks of chicken or tuna, a spoonful of garbanzo beans (chickpeas), or a dusting of nuts.
- Spread a thin layer of peanut butter on your toast, muffin, or bagel.
- Occasionally, eat eggs instead of meat. To control blood cholesterol levels, limit egg yolks to no more than 4 per week. Egg whites can be consumed in unlimited quantities.
- Enjoy a fish-containing meal at least once a week. Eat broiled, grilled, or baked fish, instead of fried fish.
- Make beans the main entrée of your meal a few times a week.
- Marinate firm tofu in your favorite marinade (it absorbs the marinade's flavors) and stir-fry with vegetables.
- Keep a small container of mixed nuts, like almonds, walnuts, and cashews, at work for an energizing afternoon snack. Beware of the calories from nuts since they add up quickly. A small handful supplies 170 to 250 calories and 14 to 21 grams of fat - most of them unsaturated.

**The Pyramid Tip.** Foods at the tip of the Pyramid should be consumed in small amounts to add flavor and enjoyment to meals and snacks. This group includes such foods as salad dressing, oil, butter, margarine, gravy, cream cheese, sour cream, sugar, soda, fruit drink and punch, jam and jelly, candy, chocolate, and gelatin. Many of these foods are empty calories—supplying a significant amount of calories without many, if any, beneficial nutrients. *Here are some tips on how to enjoy these foods in moderation:*

- Limit salad dressings to 1 - 2 tablespoons, or switch to low-fat and fat-free brands.
- Spread butter and margarine thinly.
- Try low-fat versions of cream cheese and sour cream.
- Replace sugary, high-fat snacks with fruit.
- Limit your intake of non-diet sodas since a 12-ounce serving has 150 calories and 10 to 12 Teaspoons of sugar.
- Drink 100% fruit juice instead of fruit drink.
- For the chocoholic, buy a single serving size or miniature bag of candy. Eat 1 or 2 small pieces a day or share with friends and co-workers.
- Make gelatin more nutritious by adding fruit.

**The Pyramid at a Glance.** Use the Food Pyramid as your tool to make sensible food choices. The Pyramid can help you identify the strengths and weaknesses of your current eating habits. If you consume the recommended servings for each food group daily and eat lower-fat, lower-sugar foods, you will likely get enough protein, vitamins, minerals, and fiber without excessive amounts of calories, fat, saturated fat, and cholesterol. There are also other Food Pyramids, such as the Asian Pyramid, Latin American Pyramid, and the Mediterranean Diet Pyramid. To review a specific Food Pyramid, go to the website at http://www.usda.gov/cnpp/pyramid.htm.

## OBESITY: A WEIGHTY ISSUE

Despite the fact that more than $30 billion is spent on weight loss services and products every year, the CDC reports that approximately 55% of Americans are either overweight or obese. Obesity, now a national epidemic, is linked to the major disease killers in the United States—cardiovascular disease, cancer, and diabetes. Overweight and physical inactivity account for more than 300,000 premature deaths annually, second only to tobacco-related deaths.[7] The following sections show you how to determine a healthy weight and successfully manage your weight through the years.

## WHAT IS YOUR HEALTHY WEIGHT?

Carrying around excess weight is harmful to your health. But how much is too much? Medical experts agree that your risk for weight-related health problems depends not only on your weight, but also on the amount of body fat you have and where you store it. Healthy weight is a *weight range* that correlates with a less than average risk for weight-related health conditions like heart disease, high blood pressure, and diabetes. A healthy weight may or may not affect appearance. The number on the bathroom scale is not an accurate assessment of where body fat is stored or how much fat a person carries. Use the following guidelines to help you determine your healthy weight range.

**Body Mass Index.** This is a measure used to compare your weight to your height and to assess your risk for weight-related health conditions. For most individuals, a higher Body Mass Index (BMI) correlates with above-average total body fat. The exceptions are athletes or body builders, who may weigh more than that established by weight standards and have a high BMI, but a normal or less-than-normal body fat level. A BMI of less than 25 is an optimal goal for most people, while a BMI of 25 or greater is considered overweight and a BMI over 30 is obese. Calculate your BMI according to the formula in the box below.

$$\text{BMI} = \frac{\text{Your weight (pounds)} \times 704.5}{\text{Your height (inches)} \times \text{your height (inches)}}$$

Expressed in words, your BMI equals your body weight in pounds times 704.5, divided by your height (in inches) squared.

**Waist Size.** Research shows that your waist circumference is linked to health-related medical problems. The larger your waist size, the greater your risk of high blood pressure, diabetes, heart attacks, and strokes. Prominent health organizations, for example, the National Heart, Lung, and Blood Institute, recommend that a man's waist be less than 40 inches and a woman's waist less than 35 inches. How to determine waist size is described in the box below.

To measure your waist size, use a flexible tape measure and measure your waist at the level of your belly button. Relax your stomach muscles and exhale. For accuracy, have someone else measure for you.

**Body Fat.** There are several methods to measure body fat, expressed as percent body fat. Likewise, there are several standards for acceptable body fat percentages. For example, all branches of the military set their own acceptable measurement methods and percentages of body fat. According to the Institute of Medicine (IOM), overweight is defined as having an excess of body weight, while obesity refers to an excess of body fat. The IOM definition classifies men with more than 25% body fat and women with more than 30% body fat as obese.

Use the definitions above cautiously since different methods for measuring body fat may yield dissimilar results. Depending upon the method, some individuals may be defined as obese when, in fact, they are not when measured by a more precise method. Accurate methods for measuring body fat include dual energy x-ray absorptiometry (DEXA) and underwater weighing.

Do not use a single guideline to determine your optimum weight. Some people who weigh more than that set in height-weight standards and have a high BMI may not be at increased risk for weight-related health problems if their waist sizes and body fats are at or below recommended levels. Table 8 below sets forth your risk for weight-related health problems based on the guidelines above.

| Criterion | Gender | Healthy Weight | Overweight |
|---|---|---|---|
| **BMI** | Both | 19 – 24.9 | $\geq$ 25 |
| **Percent Body Fat** | Women<br>Men | 15 – 25<br>10 – 20 | > 25<br>> 20 |
| **Waist Size** | Women<br>Men | Varies<br>Varies | > 35 inches (increased health risk when coupled with a BMI $\geq$ 25)<br>> 40 inches (increased health risk when coupled with a BMI $\geq$ 25) |

## Table 8.

**WEIGHT GAIN AND AGING**

Getting older does not have to mean weight gain. In fact, many studies have shown that aging does not cause weight gain, but several other factors contribute to weight gain over the years, such as metabolic rate, activity, and eating habits.

**Decreased Metabolic Rate.** The number of calories your body requires daily decreases about 2% every decade past the age of 25.[8] If a 25-year old needs 2,500 calories a day, that same person needs only 2,400 calories at age 45. This slight 100-calorie difference is equivalent to one slice of bread, but if the 45-year old continues to eat 2,500 calories a day for one year, he or she could gain ten pounds assuming there is no difference in activity. Weight control problems arise when adults continue to eat the same quantities of foods as they age even though metabolism and activity levels may be less than when they were younger.

**Decreased Muscle Mass** . Another consequence of aging is the loss of muscle mass. In individuals who do not exercise, muscle mass may decrease by as much as 40% by the age of 60. Muscle mass is linked to metabolic rate because muscle burns more calories than fat. The more muscle a person loses due to aging and activity reduction, the lower the metabolic rate. To minimize muscle loss, you must participate in some form of regular physical activity. Strength training, in particular, can significantly slow the amount and rate of muscle degeneration. If you do not use muscle, you will lose it.

**Activity Level** . Experts agree that the number one strategy for weight control is physical activity. And it makes sense—when you are active you burn more calories. The type of exercise, the duration, and the intensity determine exactly how many calories you expend. An additional benefit is that exercise tones and builds muscles, which in turn increases metabolic rate. This means that regular exercise increases your daily caloric requirements. The relationship between weight status and activity level is such that overweight and obese people are often caught in a vicious circle. Excessive weight, by making movement of the body arduous and painful, encourages a sedentary life-style and discourages physical activity. Reduced physical activity in turn promotes still greater weight gain.

Formal exercise does not appeal to many people, and most attempts are abandoned after a few short weeks. The good news is that people who include routine physical activity as part of their everyday life can be just as successful at weight control as those who participate in a formal exercise program. Parking your car at the far end of the parking lot, taking the stairs instead of the elevator, taking a 10-minute walk for stress release, or playing games with your children are ways to incorporate physical activity into your life. Expending an extra 100 calories a day through such activity can lead to a 10-pound weight loss over the course of one year.

**Gender** . Adult males have 10% to 20% more muscle than a female of the same body weight and age, which is why a man's caloric requirements are higher than a woman's. This is also why it is usually easier for a male to lose more weight than a female when following a diet with equal calories.

**Eating Habits** . Many people, especially those who work in high-stress, challenging positions, may forget to eat or not take time to eat. The following scenarios may be familiar—you get through your day by nibbling on a few pretzels, washing down a candy bar with a caffeine-loaded soda, or devouring a lunch of leafy greens. Toward the end of the day, you are absolutely famished. At this point, you could eat everything in the kitchen, and unfortunately you attempt to do just that, although you may not realize it.

Repeated overeating at night to make up for calories you did not eat during the day can cause weight gain. To combat nighttime overeating, redistribute your calorie intake so as to consume more during the day when your body and brain rely on calories for peak performance. Eating during the day may reduce the hunger you experience after work, and if you listen to your internal hunger cues, you may not eat as much food at night.

**Overweight Genes** . Studies show that 80% of children born to two obese parents become obese. Only 14% of children born to normal-weight parents become obese. Genetics accounts for only about one-third of a person's weight. Thus, factors that you can control, like eating habits and physical activity, have a more significant impact on your weight.

**CALORIE BASICS**

To estimate your total caloric requirement for the day, you must first determine your basic calorie needs, or your basal metabolic rate. This is the number of calories your body needs at complete rest to support basic functions such as breathing and maintaining heart rate and body temperature. Use the following three instructions to calculate your caloric requirements.

1. **Calculate your basal daily calorie requirements.** Multiply your weight by 10 if you are female or 11 if you are male. If you are overweight, use your healthy or goal weight.

   _____ x _____ = _____

   (weight) (10 or 11) (basal daily calorie requirements)

2. **Determine your activity factor.** Multiply your basal daily calorie requirement by an activity factor to account for the additional calories you expend during the day. Find the activity factor in Table 9 that best describes your usual activity level. Individuals of small body size or with little muscle mass should use the lower numbers when a range is given.

**3. Calculate your actual daily calorie requirements** .

_____ x _____ = _____

(basal daily calorie requirements) x (activity factor) = (actual daily calorie requirement for weight maintenance)

| Level of Usual Activity | Activity Factor |
|---|---|
| **Exceptionally Active:** Heavy manual labor, recruit training, special operations training, in addition to training as competitive athlete | 2.1 – 2.4 |
| **Very Active:** Typical workday includes several hours of physical labor, such as light industry and construction-type jobs. Competitive athlete, such as triathlete, marathon runner, body builder. | 1.8 – 1.9 |
| **Moderately Active:** Sedentary job plus substantial weekend recreation or 1 hour of moderate physical activity on most days or moderate to vigorous exercise three to five times a week. On your feet most of the workday, light lifting only, and no structured exercise. | 1.6 – 1.7 |
| **Slightly Active:** Sedentary for most of the day and do light activity, such as walking, for no more than 2 hours daily. | 1.4 – 1.5 |
| **Sedentary:** Describes most Americans. Sit, drive, lie down, or stand in one place for most of the day and do not participate in any type of exercise. | 1.3 |
| **Very Sedentary:** Movement restricted, such as sick at home but not confined to bed | 1.2 |

## Table 9.

The preferred method for losing weight is through a combination of eating fewer calories and burning more calories, thus producing a deficit of 250-500 calories daily compared to your normal weight-sustaining daily calorie intake. An important point to remember is that you will lose weight when you consume fewer calories than what your body requires. There are no magical pills, potions, or foods to jump start your metabolism and melt fat from your body. The equations for weight control are remorselessly simple and uncompromising:

Weight Maintenance: Calories consumed = Calories expended

Weight Loss: Calories consumed < Calories expended

Weight Gain: Calories consumed > Calories expended

One pound of body weight has the equivalent of 3,500 calories. Thus, in theory, eating 500 fewer calories every day results in a one pound weight loss every 7 days, which is an acceptable goal for most people. Minimum calorie intake levels for weight loss are 1,500 calories a day for men and 1,200 calories a day for women. More severe caloric restriction leads to unsafe, rapid weight loss, a weakened immune system unable to fight off viruses, excessive fatigue, lack of motivation, and a drop in physical and mental performance. Moreover, weight maintenance is not as easy or as effective with quick weight loss. Cutting back 200 calories a day for a year can almost result in a 21-pound weight loss. Table 10 below shows acceptable weight and body fat loss rates by military service:

**Acceptable Weight Loss as Defined by Military Service Regulations**

| | | |
|---|---|---|

| Military Service | Weight Loss | % Body Fat Decrease |
|---|---|---|
| Air Force | 5 pounds/month | 1%/month |
| Army | 3 – 8 pounds/month | Undefined |
| Navy/Marines | 1 – 2 pounds/week | 1% every 2 weeks |

**Table 10.**

**SENSIBLE EATING TO MANAGE YOUR CALORIES**

There are many reasons why people eat the way they do. Lifestyle, job stress, eating habits, emotional situations, genetic factors, and family relationships are just a few of the many factors that affect eating and, ultimately, weight. *Here are several eating tips to help you manage your weight sensibly:*

- Do not super-size your meals. It may be a bargain to buy the super-size meal at a fast food restaurant, but it is not worth the extra calories. Super-sizing a meal can add 300-500 calories to an already high-calorie, high-fat meal. Save yourself the calories. If you eat regular-size meals 4 times a week in lieu of super-size meals, you could lose up to 30 pounds in a year.

- Use smaller plates. We tend to fill a plate or bowl regardless of the size. By using smaller plates, your portions will more likely resemble the Food Pyramid serving size.

- Eat slowly. From the time you start eating, it takes your brain about 20 minutes to decide that your stomach is full, regardless of the quantity of food consumed. Put your fork down between bites and thoroughly chew your food. If you finish your first serving in under 20 minutes, drink a glass of water and wait a few minutes. You will likely feel less hungry and therefore less tempted to have second helpings.

- Eat your meals and snacks from plates. How many times have you sat down at your desk with a bag of chips, only to realize 30 minutes later that you consumed half the bag? To prevent unconscious overeating, open the container of food, place a serving or two on a plate, and put the container away.

- Switch to lower-fat versions of food when possible. Fat has twice as many calories as protein or carbohydrates, so reducing fat content can significantly reduce calories. It is not necessary to choose fat-free versions of all foods since fat is essential for life and provides flavor and enjoyment to eating.

- Read the Nutrition Facts label. Keying in on a few details may help you make better food choices. Look at the serving size. How many servings are in the container? Many breakfast muffins, even the low-fat versions, contain at least 2 servings in one muffin. Pay attention to fat grams and calories from fat. If a food contains over half of its calories from fat, you may want to look for another brand or a low-fat version that contains less fat.

- Fat-free does not mean calorie-free. When buying low-fat or fat-free foods, do not eat them in endless quantities since they do contain calories. Consume only the amount identified as one serving on the Nutrition Facts label, and remember that only eating fewer calories than you need, not fewer fat grams, will result in weight loss.

- Limit your intake of calorie-containing beverages. Studies have shown that people who drink caloric beverages may over-consume calories because calories from beverages are not as filling as calories from food. Eliminating two 12-ounce non-diet sodas or beers every day can take off 30 pounds in a year.

- Fill up on fiber. High-fiber foods like fruits, vegetables, and whole grains are filling because they occupy more space in your stomach, leaving less room for high-calorie foods. Fruits and vegetables contain considerably fewer calories than other foods. For example, to get the same caloric content of one doughnut, you can eat an apple, a handful of baby carrots, and drink a medium glass of juice. Replace a mid-morning pastry with a serving of fruit each day and lose 10 pounds in a year.

- Prevent yourself from becoming either famished or stuffed. Eating when famished may lead to overeating. How many times have you ferociously inhaled a large quantity of food after hours of eating very little? More than likely, you gobbled down your food and never gave your brain 20 minutes to register that you were full. Maintaining your hunger levels somewhere in between the two extremes can help reduce overeating.

- Set realistic goals. Aim for a 1 to 2 pound weight loss per week. If you want to lose a lot of weight, divide the weight loss into smaller, attainable goals.

- Lastly, but most importantly, do not deny yourself food. Enjoy all of your favorite foods in moderation. Ignoring your cravings may end in binges that pack on extra pounds. Satisfy a craving before it becomes all-consuming by allowing yourself to eat a small portion. Eating a handful of chips with lunch is better than devouring a whole bag for a late night snack.

**THE DIET CRAZE: FACTS, FADS, AND WARNINGS**

At any one time, approximately two-thirds of Americans are struggling with their weight. A 1995-1997 survey of active duty Army personnel indicated that approximately 60% of women and 37% of men reported trying to lose weight in the preceding 12 months.[9] Search for "diet" on the Internet, and you are bombarded with thousands of web sites proclaiming the success of miracle diets. Americans gobble up these diets almost as much as they do burgers and fries. Yet, research shows that 95% of people who lose weight will regain all of it, if not more, within 5 years. You can improve your weight control success by losing weight slowly (1-2 pounds/week), consuming fewer calories, expending more calories through activity/exercise, and incorporating permanent life-style changes in your eating and activity habits.

**Diet Facts.** For most people, diets are not successful over the long term. Popular diets often require the elimination of some foods or adherence to specific menu plans without substitutions. Most people can adhere to strict limitations for a short time, but not for the rest of their lives. How you eat to lose weight is very similar to how you eat to maintain weight. The difference between weight loss and maintenance is generally a few hundred calories, the equivalent of one small sandwich daily.

Do not use the word "diet" to describe how you lose weight. This word invokes dreadful thoughts of starvation, lettuce salads, and deprivation. For most people, diets are not necessary or practical for weight management. Think about your own eating habits. Do you snack when you are not hungry? Do you try to make it through the day with minimal food intake and then overeat at night? Does your physical activity consist of getting up and down from your desk to go to meetings? Do fast food restaurants seem like your home away from home? Making a few simple changes in your eating habits can result in significant weight loss over time. For example:

- Substituting a side salad and low-fat dressing for french fries saves you 220 calories per meal, resulting in a 10-pound loss in a year, assuming 3 such substitutions a week.

- Replacing one alcoholic beverage a day with water saves you 100 to 200 calories, or 15 pounds a year.

- Eating a medium-size bowl of whole-grain cereal and low-fat milk for breakfast instead of a fast food breakfast sandwich saves you 150 to 250 calories a day and a loss of 15 pounds a year.

Diets often fail to teach you how to make appropriate food choices on your own. Diets use a cookbook approach to weight loss—one recipe fits all. The error in this approach is that people respond to weight loss differently and have specific food preferences. For successful weight loss and maintenance, choose healthy foods that you like and tailor your eating habits to your lifestyle—create a program that you can live with for the rest of your life.

**Diet Fads.** If you are a "diet connoisseur," you may have realized that many diets are based on similar assumptions, but are disguised under different names. Diets seem to parallel fashion trends—particular diet crazes become trendy. Popular high-protein, low-carbohydrate diets of the 1970s and 1990s, identified carbohydrates, not calories, as the culprit of weight gain. These diets did not solve our weight problems 30 years ago, nor do they today. The following sections take a look at the facts and fiction behind popular diets.

*Food Specific Diets.* These diets claim that some foods possess special qualities to aid in weight loss. Here is the fact: no single food is magical when it comes to weight loss. Grapefruit does not burn fat, and cabbage does not rev up your metabolic rate. How do these diets work? Eating a very limited selection of foods often results in boredom. You get tired of eating the same foods day after day and eventually you eat fewer calories than you did before, which results in weight loss.

These diets do not promote healthy eating habits. Moreover, following them over the long term would be very difficult. Be realistic—do you really want to eat cabbage soup every day for the rest of your life?

*High-Protein, Low-Carbohydrate Diets.* The idea behind these diets is that carbohydrates cause weight gain and obesity. The diet's advocates claim that carbohydrates increase insulin levels in the blood, causing carbohydrate calories to be stored as fat. The truth is that insulin is released into the bloodstream when carbohydrates are consumed. However, carbohydrates are stored as fat only when one eats more calories than needed, regardless of whether it is fat, protein, or carbohydrate calories.

Some people who have large waists release more insulin when they consume simple sugars like sodas, candy, cakes, and cookies. The insulin quickly removes the excess sugar from the bloodstream, which lowers blood sugar. Eating sugary foods does not necessarily result in more fat storage, but it does tend to increase the feeling of hunger again, which can lead to overeating. Eating carbohydrates does not cause problems with insulin. Being overweight and inactive causes insulin problems.

People may lose weight on these diets because the prescribed menus provide only 850 to 2,000 calories a day, significantly fewer than the average American consumes on a daily basis. Initial weight loss is primarily water as the body depletes its carbohydrate stores (carbohydrates are stored in the body with lots of water). Subsequent weight loss occurs as the body "eats" its muscle tissue for energy since daily caloric intake is not enough to meet the body's requirements. Eventually the body may burn fat stores; however, body fat percentage may actually increase as a result of eating more fat from high-fat protein sources and the body's ability to hold on to fat stores as it consumes muscle and other major organs for energy.

When too few carbohydrates are consumed, the liver converts body fat and dietary fat into energy. This potentially harmful condition is called ketosis. Ketones are by-products of ketosis, and if they are not excreted in the urine, they can reach toxic levels in the bloodstream. Your liver and kidneys work harder than usual to excrete them. To reduce the risk of ketone toxicity, very low carbohydrate diets (5 to 25 grams of carbohydrates per day) should not be consumed for more than 14 consecutive days. Side effects of ketosis include nausea, weakness, dehydration, fatigue, insomnia, and "fruity" breath. A diminished appetite, considered to be a favorable side effect, is the most common. Consuming approximately 100 grams of carbohydrates per day can prevent ketosis.

Another risk to eating high-protein diets is the relationship to heart disease. Most people experience a reduction in blood cholesterol levels during weight loss, regardless of the type of diet. However, high-protein diets can be much higher in fat than one typically consumes. High-fat diets can increase the risk for heart attacks, stroke, and some types of cancers. Additionally, high-protein, low-carbohydrate diets may be low in potassium, vitamins A and C, folic acid, carotenoids, and fiber—all of which help to prevent certain cancers and heart disease. Thus these diets should be used with caution. Persons with known kidney disease or a family history of kidney problems should be especially cautious since these diets can potentially aggravate or cause kidney complications.

Do high-protein, low-carbohydrate diets promote healthy life-long eating habits? Can you live without cookies, pancakes, or pasta for the rest of your life? Will you end your weight problem forever if you deny yourself carbohydrates? The answer is probably no to all three questions.

*Liquid Diets.* There are two types of liquid diets: medically supervised diets permitting very few calories and over-the-counter liquid meal replacements. Liquid meal replacements are sold as beverages in almost every grocery store, convenience market, and pharmacy from coast to coast. The manufacturers of these products claim that drinking two beverages during the day and eating a "sensible" dinner causes weight loss. If the only food you consume all day is two 250-calorie liquid meals, how "sensible" is your dinner going to be? You will probably be famished at the end of the day.

The human appetite is stimulated and satisfied by smell, taste, texture, and chewing. Ask yourself if you are really going to be satisfied with "drinking" your calories. Drinking them over the long term will likely not produce the desired weight loss. Data published by one of the meal replacement companies showed that after more than 2 years on the program, women lost a total of 13 pounds and men lost 14 pounds.[10] This result is the equivalent of a half-pound weight loss per month. Only 51% of those who enrolled in the program stayed for its entirety, despite receiving $25 a week to stay on the plan.

If you like these beverages, use them as emergency meals when you are hungry and there is no time for anything else, or as a convenient "energy boost" during the day. For weight control, think realistically—how can you change your eating habits permanently?

**Diet Warnings.** The news media bombard us with nutrition stories daily. According to the American Dietetic Association's "Nutrition and You: Trends 2000" survey, approximately 47% of Americans regard television and magazines as their major sources of nutrition information. Forty-three percent like to hear about new research studies, but 37% believe that the news

tells them only what they should *not* eat. To separate fact from fiction, here is a list of questionable diet recommendations to be alert for:

- Programs or diets that promise a quick fix. A quick fix often turns out to be a temporary fix. You did not gain weight overnight and you surely are not going to lose it overnight.

- Claims that sound too good to be true. Flashy statements like "eat these foods to lose weight" and "this pill magically melts fat and increases your energy" are extremely enticing and make weight loss sound easy. The truth is that weight loss is not easy. It takes discipline, common sense, and strong motivation.

- Diets that eliminate specific foods or food groups. Remember that your body needs over 40 different nutrients to function at its best. Limiting some foods for a length of time can lead to nutrient deficiencies, which affect both your performance and health.

- Diets that include "good food" and "bad food" lists. All foods can fit into a healthy eating plan. The key is to eat high-calorie, nutrient-deficient foods less often and in small quantities. Be sensible—reward yourself with a candy bar or a doughnut once or twice a week instead of every day and lose 4 pounds in 6 months.

- Diets or gimmicks that are not approved by reputable organizations such as the American Dietetic Association, the American Heart Association, or the American Medical Association. Professional organizations support many health and weight issues that are backed by years of well-documented and published research. Many diet products are not supported by legitimate research.

- Diets or programs that ignore differences among individuals. A successful weight control Program makes allowances for individual needs, wants, and desires, and no one else's. A personal plan may promote a lifelong behavior change.

- Diets and products that dismiss the importance of exercise in either weight loss or maintenance.

- Diet claims based on research published without peer review. Articles published in a peer-review journal are scrutinized and approved by several licensed professionals or scientists prior to publication, and only legitimate research is printed in peer-review journals. The authors of several best-seller diet books do not publish their research in peer-review journals.

- Diet gimmicks based on a single research article. Reported research findings from a new study can create unnecessary alarm and confusion. One study does not change everything that we have known to be true for several years. Studies conducted by other researchers with the same results are more valid than a single study.

**Eating for Longevity and Health**

Eating-for-health strategies are similar to those based on eating for performance. At times, it may be difficult to see the big picture within the do-more-with-less environment in which you may live. You survive each day, somehow keeping pace with the clock and managing to eat healthfully sometimes. You may ask yourself, "Is it really worth it?" The answer is yes. Look beyond today. How you eat for performance today fuels your health for tomorrow. The following sections shed light on achieving lifelong health and ultimately a rewarding quality of life.

**Fiber: Your Link to Disease Prevention.** Dietary fiber, a type of complex carbohydrate, is a key component of a healthy diet. Whole-grain products and starchy beans, fruits, and vegetables supply not only fiber, but also essential vitamins, minerals, and phytochemicals that reduce your risk of some chronic diseases. Although numerous research studies have documented the many benefits of eating adequate fiber, most Americans do not consume enough. See Table 11 below for the amounts recommended.

**Recommended Dietary Fiber Consumption**

*Adults:* 25 – 35 grams/day

or

10 – 13 grams per 1000 calories consumed

*Children:* Age + 5, e.g.
a 10-year old should eat 15 grams/day (10 + 5)

Source: National Cancer Institute

## Table 11.

*What is fiber?* Fiber is the non-digestive part of plant foods. Your body cannot break down fiber, and it passes through your intestines unabsorbed. Inside the stomach, some types of fiber (see next section) act like a sponge, absorbing some of the sugar, fat, and cholesterol that are present. Therefore, eating a meal with substantial fiber can significantly reduce or slow the amount of sugar, fat, and cholesterol that enter into your bloodstream. Limiting the amount of fat and cholesterol in the bloodstream helps to reduce blood cholesterol levels and heart disease risk. Slowing the absorption of sugar helps control blood sugar levels in diabetics.

Fiber is filling, and people who eat more fiber generally weigh less than those who do not consume as much. This may be because fiber takes up space in your stomach, causing a feeling of fullness. As fiber intake increases, caloric intake may decrease because you are not as hungry for other foods, like desserts, sweets, and high-calorie foods.

Benefits of fiber can be summed up as follows:

- Promotes regular bowel movements.
- Can ease symptoms of chronic constipation, hemorrhoids, and diverticular disease.
- Helps normalize blood sugar levels.
- Helps with weight loss and weight management.
- May help prevent heart disease and certain cancers.

There are two kinds of dietary fiber—soluble and insoluble.

- *Soluble fiber* absorbs water and slightly expands to create a gel-like substance. A similar event occurs when you add liquid to oatmeal (a soluble fiber); it swells and thickens as it cools. Soluble fiber helps reduce blood cholesterol levels and control blood sugar levels. Foods such as oats and oat bran, barley, brown rice, starchy beans, and many vegetables and fruits contain soluble fiber.

- *Insoluble fiber* does not absorb water and is primarily responsible for moving waste products through your intestinal tract. Whole-grain breads and cereals, wheat and corn bran, many vegetables, and the skins of fruits and vegetables contain insoluble fiber that promotes intestinal health, to include the prevention of colon and colorectal cancers, constipation, and hemorrhoids.

Depending upon your reasons for increasing dietary fiber, you may eat one type of fiber more often. However, an ideal goal for most people is to eat the amount of fiber recommended by the National Cancer Institute, regardless of whether it is soluble or insoluble.

You may think you are eating enough fiber, when in fact you are not. If you increase fiber in your diet, do so slowly to give your body time to adjust. A sudden increase in fiber consumption can cause uncomfortable bloating, nausea, and cramps. Also, drink lots of fluids, preferably water, to help fiber move easily through your intestinal tract. Read the Nutrition Facts label for the fiber content. Many labels do not distinguish between soluble and insoluble fiber; many list the total fiber content. Upon reviewing some labels, you may be surprised to realize that the fiber content is not as high as you expected.

- *How to Spot Whole Grain Products.* The term "whole-wheat" or "whole-grain" must be in the ingredient list, preferably as the first or second ingredient. Brown bread made from "wheat flour" or "unbleached wheat flour" *is not* whole-grain bread. Cereals and crackers labeled as "multi-grain" may contain very minimal fiber. Examples of whole-grains:

whole wheat flour, brown rice, oatmeal, oats, wheat germ, barley, millet, and quinoa.

- *Products That Are Not Whole Grain.* Cream of wheat, cream of rice, pasta, couscous, and products made from "wheat flour" or "unbleached wheat flour" do not contain whole grains. Wheat flour has the same nutritional value as white flour; it is simply not bleached white.

- *Good Source of Fiber* : A food with at least 2.5 grams of fiber per serving.

The majority of studies validating the many benefits of fiber are based on the use of real food instead of fiber supplements. Therefore, fiber alone may not be responsible for good health. Possibly, the combination of fiber and other powerful nutrients like phytochemicals, vitamins, and minerals is responsible for fiber's potent favorable impact on disease prevention. *Tips for getting more fiber are:*

- Choose brown rice over white rice.
- Buy cereals that have 2.5 or more grams of fiber per serving.
- Mix a high-fiber cereal (10 to 13 grams of fiber/serving) with lower-fiber cereals.
- Make sandwiches with whole-grain breads, like whole wheat bread.
- Enjoy whole-grain crackers, like Triscuits, with cheese or peanut butter.
- Eat starchy beans like kidney, pinto, or navy beans. Add to salads, toss with vegetables, or eat them plain.
- Eat fruit as snacks or mix with yogurt, cereal, or salads.
- Enjoy vegetables with meals or snacks.
- Mix wheat germ with yogurt.

**The Truth About Dietary Fat.** You need to eat some fat for health, but eating too much fat, especially saturated fat, increases your risk of heart disease, including heart attack and stroke. The American Heart Association recommends that 30% or less of your calories come from fat, broken down among the three fat groups as follows: saturated, 8-10%; monounsaturated, 10-15%; and polyunsaturated, less than 10%. The following sections review the dietary implications of fat and its different types.

*Fat.* Most experts agree that a diet containing 20% to 30% fat is a reasonable goal for nearly everyone. Although consuming a diet that contains less than 10% fat has been proven to reverse heart disease and the damage caused by high cholesterol levels, it is probably not a realistic goal for most people. Eating less than 10% of your calories from fat is simply too restrictive, and therefore would be very difficult to maintain long-term.

Your fat intake allowance depends on your daily caloric intake. Table 12 below shows what your daily fat gram allowance is for a diet of various calorie levels but all containing 20% to 30% fat.

| Calorie Level | Daily Fat Gram Allowance |
|---|---|
| 1,200 | 27 – 40 |
| 1,500 | 33 – 50 |
| 1,800 | 40 – 60 |
| 2,000 | 44 – 65 |
| 2,500 | 56 – 83 |
| 3,000 | 67 – 100 |
| 3.500 | 78 – 117 |

**Table 12.**

Fat intake can add up quickly during the day, especially if you dine out frequently. Restaurant food can be much higher in fat than you typically consume at home. Table 13 below shows how slight modifications can significantly change total fat intake for the day.

| TYPICAL MEALS | MODIFIED MEALS |
|---|---|
| Ham, egg, & cheese bagel | 1 cup bran flakes with low-fat milk |
| 550 cal, 25 grams of fat | 1 banana |
| | 1 cup juice |
| Bacon & cheese grilled | 360 cal, 5 grams of fat |
| chicken sandwich | |
| Large order of french fries | Grilled chicken sandwich |
| Large non-diet soft drink | Small order of french fries |
| 1,610 cal, 67 grams of fat | Water |
| | 600 cal, 30 grams of fat |
| 12-oz. sirloin steak | |
| Caesar salad | 12-oz. sirloin steak |
| Baked potato with 2 tbsp butter | Salad with fat-free dressing |
| 1,100 cal, 58 grams of fat | Baked potato with 1 tbsp butter |
| | 840 cal, 21 grams of fat |
| **Daily Total:** | **Daily Total:** |
| 3,260 calories | 1,800 calories |
| 150 grams of fat (41% fat) | 56 grams of fat (28% fat) |

**Table 13.**

Read the Nutrition Facts label for fat content or ask for nutrition information at restaurants. Even seemingly harmless beverages like popular cappuccinos and frozen coffee drinks can contain 22 to 44 grams of fat depending on the size and contents.

*Saturated Fat.* Not all fat is created equal. It is important to limit total fat, but it is *very* important to limit saturated fat intake. Saturated fat is generally solid at room temperature. It is the dense, opaque fat that floats on the top of broth. Saturated fat is the marbling seen in meats, but it is also hidden between the muscle fibers of meat and not always visible. A diet high in saturated fat can clog arteries and increase blood cholesterol levels even more than dietary cholesterol intake. Eating excessive amounts of saturated fat can ultimately cause heart attacks and strokes.

*Unsaturated Fat.* Unsaturated fats, such as monounsaturated and polyunsaturated, help decrease blood cholesterol levels, therefore reducing your risk for heart attack and stroke. Unfortunately, many Americans consume too much saturated fat and not enough unsaturated, particularly monounsaturated. In comparison to saturated fats, unsaturated fats are soft or liquid at room temperature.

*Trans Fatty Acids.* Research has shown that these fats can increase cholesterol levels just as much as saturated fat does. Trans fatty acids are found naturally in small amounts in meat and milk, and they are created artificially when unsaturated, liquid fat is chemically altered to create a fat that is more solid and shelf-stable. This process is called hydrogenation. Margarine and shortening are examples of hydrogenated fats since they were created from the chemical transformation of liquid oils into solid fats. Try to avoid products for which "partially hydrogenated oil" or "hydrogenated oil" are listed in the ingredient list (manufacturers are not required to print the amount of trans fatty acids on the label); be cautious of margarines, prepared foods, cookies, and crackers, many of which contain trans fat. In lieu of regular margarines, buy Promise, Smart Beat, or Fleischmann's trans-free margarines; begin looking for stated grams of trans fatty acids (which may be required in the future). Try Benecol and Take Control products (margarine-like spread and salad dressing) which are made of plant sterol esters, not trans fats, and claim to "promote healthy cholesterol levels."

The food industry is experimenting with low-trans and trans-free alternatives to use in baking and cooking. Until they become available, you should think twice about ordering popular restaurant appetizers. Consider: Batter-dipped fried onion has 2,100 calories and 163 grams of fat, 81 of which are saturated and 18 trans fat. Cheese fries with ranch dressing have 3,000 calories and 217 total fat grams, 81 grams of which are artery-clogging saturated fat and 11 grams of trans fat. That is the fat equivalent of eating a 16-ounce prime rib, a 9-ounce country fried steak, and a super-size order of fries topped off with a fudge brownie sundae!

The differences between types of fat can be very confusing even to the most knowledgeable of consumers. Table 14 below provides a quick look at which foods contain which types of fat and their corresponding roles:

| Type of Fat | Food | Role |
|---|---|---|
| **Saturated Fat** | Butter, lard, dairy products (except fat-free), meat, poultry, tropical oils: palm, palm kernel, coconut oils | Increases blood cholesterol levels and low-density lipoprotein (LDL) levels (bad cholesterol) |
| **Polyunsaturated Fat** | Corn, sesame, cottonseed, soybean, sunflower, and safflower oils<br><br>Fish oils (omega-3 fatty acids) found in salmon, mackerel, herring, tuna | Decreases LDL levels<br><br>Helps prevent blood clots |
| **Monounsaturated Fat** | Canola, olive, and peanut oils | Decreases LDL levels |

## Table 14.

**Cholesterol Facts.** Although cholesterol is a fat-like substance, it is not a fat. The term cholesterol refers to two different types: blood cholesterol circulating in the bloodstream, and dietary cholesterol found in food. In the body, cholesterol functions as a constituent of all body cells and of some hormones. It also helps with fat digestion and, along with sunlight, helps produce vitamin D.

While many factors affect blood cholesterol levels, the cholesterol that circulates in your body comes from two sources: your liver and the foods you ingest. Your liver produces enough cholesterol to meet your needs. When your liver produces too much cholesterol, your blood cholesterol level may rise, increasing your risk for heart disease. Dietary cholesterol is found in foods and beverages of animal origin, such as eggs, meats, poultry, fish, and dairy products. Eating excessive amounts of dietary cholesterol is one factor that elevates blood cholesterol levels in some people. However, dietary cholesterol does not automatically become blood cholesterol. Your total fat intake, especially saturated fat, has a more significant effect on blood cholesterol levels than dietary cholesterol alone.

To reduce your risk of heart disease, the American Heart Association recommends that Americans consume no more than 300 milligrams of dietary cholesterol a day. Often, foods high in cholesterol are also high in saturated fat. Therefore, reducing your saturated fat intake may cause a simultaneous decrease in cholesterol intake.

Foods from plant sources do not contain cholesterol, but some plant-derived foods may supply fat, which is mostly heart-healthy unsaturated fat. Although the fat content can be relatively high for the small portion size, the foods shown below and other similar foods high in unsaturated fat can be part of a sensible, healthy diet when consumed in moderation.

- Peanut butter (2 tbsp): 0 mg cholesterol, 16 g of fat, of which only 3 g are saturated fat
- Walnuts (1/3 cup): 0 mg cholesterol, 20 g fat, 2 g saturated fat
- Olive oil (1 tbsp): 0 mg cholesterol, 14 g fat, 2 g saturated fat
- *Here are some additional tips for maintaining or improving heart health:*
- Reduce meat portions to 2-3 ounces per meal for a total of 4 to 7 ounces a day. A 3-ounce portion is about the size of a deck of cards.
- Increase your intake of food that contains minimal fat, such as fruits, vegetables, and whole-grain complex carbohydrates.
- Choose low-fat/fat-free dairy products or limit your intake of whole-fat dairy foods, like cheese and whole milk.

- Enjoy 1 or 2 "meatless" meals per week. Eat dry beans (kidney, navy, pinto beans), tofu, or meatless chili instead of protein-containing food of animal origin.
- When possible, use oils in place of solid fats.
- Use liquid or tub margarine instead of stick margarine. The more solid the margarine, the higher the trans fatty acid content.
- Eat a fish-containing meal at least once a week for a source of heart-healthy fish oils.
- Eat a small handful of nuts 3-4 times a week to increase your intake of unsaturated fat.

**The Secrets of Soy.** In 1999, the Food and Drug Administration (FDA) approved the use of health claims with regard to foods containing soy protein. This step was based on the conclusions of both the FDA and scientific researchers that eating soy protein in combination with a diet low in saturated fat and cholesterol may reduce the risk of heart disease by reducing blood cholesterol levels. To qualify for this claim, a food must contain at least 6.25 grams of soy protein per serving. Scientific studies show that 25 grams of soy protein eaten daily is enough to lower LDL, or "bad" cholesterol, by about 10 % in people who have an LDL level above 160.

The isoflavones found naturally in soy protein are largely responsible for the beneficial action of soy products. Isoflavones are phytoestrogens, or weak estrogen-like substances, made by plants. The theory is that they may protect the heart like the estrogens that are naturally produced by premenopausal women or the estrogen pills taken by postmenopausal women. Since research studies are based upon soy protein powders, the benefit of taking isoflavone supplements in isolation is unknown. Soy protein may offer other potential health benefits for cancer, menopause, and osteoporosis. However, more research is needed in these areas before firm conclusions can be drawn.

Following is a list of common soy-containing foods and their average soy protein content as stated on the Nutrition Facts label. For heart health, aim to eat 25 grams of soy protein a day.

- 3 oz water packed tofu: 8.5 grams
- 3 oz silken firm tofu: 6 grams
- 8 oz plain soymilk: 8 grams
- 8 oz vanilla soymilk: 6 grams
- ¼ cup soynuts: 12 grams
- 2 tablespoons soynut butter: 8 grams
- 1/3 cup soy protein powder: 18 grams
- 2 oz soy protein crumbles (1/2 cup): 9 grams
- 1 soy burger: 10 grams
- ½ cup black soybeans: 9 grams
- 1 soy protein bar: 14 grams
- ¼ cup dry textured vegetable protein: 12 grams

**The Confusing World of Dietary Supplements.** In 1998, Americans spent more than $12 billion on dietary supplements that promised everything from weight loss and more energy to delayed aging and a cure for impotence. With more than half of the American population ingesting some type of supplement, the question is, "Are they safe and effective?"

A dietary supplement is any product intended for ingestion as a supplement to food intake. Such supplements include vitamins, minerals, herbs, botanicals and other plant-derived substances, amino acids, and food concentrates, metabolites, constituents, and extracts. Because many consumers believe that dietary supplements benefit health and want the right to choose which supplements to take, Congress in 1994 passed the Dietary Supplement Health and Education Act (DSHEA). Under DSHEA, dietary supplements are recognized as separate from drugs and are not required to undergo years of safety testing before being put on the market. This is in direct contrast with the marketing of drugs, which must undergo years of clinical studies to determine their effectiveness, safety, possible interactions with other substances, and appropriate dosages, all subject to subsequent review and approval by the FDA.

Dietary supplement manufacturers, however, need only submit to the FDA information to support their conclusion that the ingredients in their supplements are reasonably safe. Once a dietary supplement becomes available for purchase, the FDA must prove that it is unsafe before it can take action to restrict its use. Such was the case in 1997 when the FDA proposed to limit the amount of ephedra-containing substances in dietary supplements (marketed as ephedra, ma huang, Chinese ephedra, and epitonin) and warned consumers of the potential hazards associated with its use. There have been over 800

reported adverse reactions and at least 39 deaths associated with ephedra-containing products. Since individual states may restrict or stop the sale of potentially harmful dietary supplements within their jurisdictions, several states restrict or ban the sale of ephedra-containing supplements.

All dietary supplements must have a supplement label that lists the ingredients and provides truthful information to assist consumers in making informed choices. Moreover, the label must contain the following declaration: "This statement has not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease." The fact is that many manufacturers do not have legitimate scientific evidence to support their claims. In several circumstances, the FDA has instructed manufacturers to modify a claim because there was no existing research to support it.

Since there is not a strict government authority to regulate the dietary supplement industry, take caution when buying dietary supplements. Remember these facts the next time you consider taking a supplement:

- Of more than 20,000 dietary supplements on the market, only 46 have received a safety review by the FDA.
- There are no quality standards to ensure that products do not contain dangerous pesticide residues, chemical contaminants, or heavy metals, like lead or mercury.
- Studies conducted by independent researchers show that some dietary supplements contain none of the active ingredient stated on the label. Other supplements contain the active ingredient, but not in the amount stated on the label and still other supplements cannot be broken down and absorbed in the body.
- Unlike prescription drugs, dietary supplements can be sold without having proven benefits.

Informal polls report that many Americans believe that dietary supplements can help stop cancer and a majority believe they can help treat arthritis and colds. The manufacturers do not need proof! Americans will spend billions of dollars on these products every year, regardless of their actual safety or effectiveness.

If you take dietary supplements, consider these recommendations:

- Read reputable web sites, health newsletters, and medical journals for the most current and accurate information on a specific dietary supplement. See Appendix D for a list of resources.
- Buy supplements manufactured by nationally known companies since they are more likely to conduct research on their products.
- Start with a small dose of the supplement to monitor side effects. Slowly increase to the recommended dose on the label while continuing to monitor for any adverse side effects.
- Use single herbal supplements instead of a combination of herbal products in one supplement. This enables you to determine which herb may cause an adverse reaction.
- Pregnant or breastfeeding women and children should not take dietary supplements unlessprescribed by a physician.
- Take herbal supplements and prescription drugs at different times since some herbs may interfere with a drug's action. Additionally, mixing some herbs and drugs may cause severe medical complications or even death.
- Stop taking dietary supplements as least 2 weeks before an elective surgery.
- Tell your health care provider what dietary supplements you are taking.
- Most importantly, report an adverse reaction from a dietary supplement to the FDA's

MedWatch system at 1-800-FDA-1088 or file a report at http://www.fda.gov/medwatch/

**EATING FOR PERFORMANCE AND HEALTH: PUTTING IT ALL TOGETHER**

This chapter has supplied you with the nutrition facts you need to make sensible food choices. There are no magic pills, potions, or foods to guarantee a healthy life. However, here in summary form are 10 precepts to help you maximize your performance each day and promote life-long health:

Eat at least 5 servings of fruits and vegetables daily.

- Eat a healthy breakfast and then eat at least two more meals throughout the day, consuming foods from all groups of the Food Pyramid.
- Use the Food Pyramid as a guide to appropriate portion sizes.
- Implement a personal healthy eating plan that is adapted to your lifestyle.
- Stock healthy, non-perishable foods in your office, car, and suitcase.
- Balance your caloric intake with your caloric expenditure.
- Eat a moderate amount of fat (20% to 30% of your calories), but reduce your intake of artery-clogging saturated fat.
- Choose whole-grain complex carbohydrates as often as possible, while limiting your intake of added sugars.
- Eat at least 4 to 7 ounces of low- to moderate-fat protein-rich foods throughout each day.
- Drink a minimum of 64 ounces of fluids a day, limiting caffeine-containing beverages.

The ancients tell us, "Mens sana in corpore sano" ("Cultivate a sound mind in a sound body"). It is hoped that in this chapter you have learned what foods to eat as part of a long-term life program to achieve both a sound mind and body.

**ENDNOTES**


1. Nancy Clark, *Sports Nutrition Guidebook,* Champaign, IL: Human Kinetics, 1997.

2. W. D. McArdle et al., *Exercise Physiology*, Baltimore, MD: Williams & Wilkins, 1996.

3. Nancy Clark, *Sports Nutrition Guidebook,* Champaign, IL: Human Kinetics, 1997.

4. L. Harrison et al., *Physical Activity Patterns and Satisfaction with Fitness Facilities among Military Members and their Families*, MFR Technical Report 98-3 (AD Number: A355559), Scranton, PA: The Military Family Institute of Marywood University, 1998.

5. D. S. Michaud et al., "Fluid Intake and the Risk of Bladder Cancer in Men," *New England Journal of Medicine*, Vol. 340, 1999, pp. 1390, 1424.

6. *Nutrition Action Healthletter*, November 1998.

7. D. B. Allison et al., "Annual Deaths Attributable to Obesity in the United States," *Journal of the American Medical Association*, Vol. 282, 1999, pp. 1530-1538.

8. National Research Council, *Recommended Dietary Allowances*, 10th Edition, Washington, DC: National Academy Press, 1989.

9. J. T. Warber et al., *The Army Food and Nutrition Survey, 1995-97*. Technical Report T00-6 (AD Number: A371817), Natick, MA: U.S. Army Research Institute of Environmental Medicine, 1999.

10. J. Kirby, *Dieting for Dummies*, Foster City, CA: IDG Books Worldwide, 1998.

## Appendix A. Pyramid serving sizes

**VISUALIZING FOOD AMOUNTS**

- Golf Ball = 1 oz meatball or 2 tbsp peanut butter
- Deck of cards = 3 oz of cooked meat
- 3 Dominos = 1 ½ oz cheese
- B aseball = 1 cup
- ½ **baseball** = ½ cup
- Thumb = 1 oz cheese
- Tip of thumb = 1 tsp

### Bread, Cereal, Rice, & Pasta Group

**(low-fat choices have 80-100 calories)**

- 1 slice bread
- 1 small roll, biscuit, or muffin
- 5-6 small crackers (saltine size)
- 3-4 large crackers (graham cracker size)
- ½ cup rice, pasta, or cooked cereal
- 1 oz dry cereal (1/2–1 cup depending on type)
- 1 4-inch pancake
- 2 cups hot-air popped popcorn

### Vegetable Group

**(15-40 calories; starchy vegetables have 100 calories)**

- ½ cup cooked vegetables
- ½ cup cooked dry beans (if not counted as a meat)
- ½ cup tomato or spaghetti sauce
- 1 cup raw, leafy vegetables
- ¾ cup vegetable juice
- 1 small baked potato
- 1/2 cup cole slaw (contains added fat)

### Fruit Group

**(60-100 calories)**

- ½ cup raw/canned/cooked fruit
- 1 medium whole fruit, such as apple, banana, orange, nectarine
- ¾ cup juice
- ½ grapefruit
- 10-12 grapes

- ¼ cup dried fruit or raisins

## Milk, Yogurt, and Cheese Group

**(90 calories or more)**

- 1 cup (8 oz) milk or yogurt
- 1 ½ oz natural cheese (cheddar, feta, blue, mozzarella)
- 2 oz processed cheese
- ½ cup ricotta cheese
- 2 cups cottage cheese (to equal calcium in 8 oz milk)
- 1 cup frozen yogurt
- 1 ½ cups ice cream

## Meat, Poultry, Fish, Eggs, Dry Beans, & Nuts Group

**(55-75 calories per oz for lean to medium-fat meat, 100 calories per oz for high-fat meat or 2-3 oz cooked, lean meat without bone)**

- ½ of 6 ½ oz can tuna in water (3+ oz)
- 1 medium chicken breast half (3 oz)
- 2 chicken legs (3 oz)
- ¾ cup cooked chopped meat (3 oz)
- piece of meat the size of a deck of cards (3 oz)
- 1 egg (1 oz)
- ½ cup cooked dry beans, if not counted as a vegetable (1 oz)
- 2 tbsp peanut butter (16 grams of fat)
- 1/3 cup nuts (20-25 grams of fat)
- ¼ cup seeds, like pumpkin/sunflower (1 oz contains 5-20 grams of fat)
- 1 oz cheese (if not counted as dairy)

## Pyramid Tip

*Fats.*

- 1 tsp margarine/butter 30-35 cal
- 1 tbsp mayonnaise 100 cal
- 1 tbsp salad dressing 60-80 cal
- 1 tbsp cream cheese 50 cal
- 1 tbsp sour cream 30 cal
- 1 tbsp cooking or salad oil 120 cal
- 1 slice bacon 35 cal

*Sweets.*

- **1 tsp sugar/jam/jelly 15 cal**
- **1 tsp honey or syrup 20 cal**
- **20 fluid oz non-diet soda 250 cal**

## Appendix B. Lactose-containing foods

| Product | Serving Size | Approximate Lactose (grams) |
|---|---|---|
| Milk: whole, low-fat, skim, sweet acidophilus, buttermilk | 1 cup | 10-12 |
| Goat milk | 1 cup | 9 |
| Lactose-reduced milk | 1 cup | 2-4 |
| Nonfat dry milk | 1/3 cup | 12 |
| Half-and-half | ½ cup | 5 |
| Whipping cream | ½ cup | 3 |
| Sour cream | ½ cup | 4 |
| Butter/margarine | 1 tsp | Trace |
| Cottage cheese | ½ cup | 2-3 |
| Yogurt, low-fat | 1 cup | 5 |
| Cheese: American, swiss, blue, cheddar, parmesan, or cream cheese | 1 oz | 1-2 |
| Ice cream, regular and low-fat | ½ cup | 6-9 |
| Sherbert, orange | ½ cup | 2 |

## Appendix C. Iron-containing Foods

| Food | Serving Size | Approximate Iron (milligrams) |
|---|---|---|
| Beef liver, cooked | 3 oz | 5.8 |
| Lean sirloin, cooked | 3 oz | 2.9 |
| Lean ground beef, broiled | 3 oz | 1.8 |
| | | |

| | | |
|---|---|---|
| Skinless chicken breast, dark meat, roasted | 3 oz | 1.1 |
| Skinless chicken breast, white meat, roasted | 3 oz | 1.0 |
| Pork, lean, roasted | 3 oz | 1.0 |
| Salmon, canned with bone | 3 oz | 0.7 |
| Fortified breakfast cereal | 1 cup | 4.5-18 |
| Pumpkin seeds | 1oz | 4.25 |
| Bran | ½ cup | 3.5 |
| Blackstrap molasses | 1 tbsp | 3.5 |
| Soybean nuts | ½ cup | 4.0 |
| Spinach, cooked | ½ cup | 3.2 |
| Red kidney beans, cooked | ½ cup | 2.6 |
| Prune juice | ¾ cup | 2.3 |
| Enriched rice, cooked | ½ cup | 1.2 |
| Raisins | 1/3 cup | 1.1 |
| Prunes, dried | 5 | 1.1 |
| Whole wheat bread | 1 slice | 0.9 |

## Appendix D. Nutrition Resources

**Dietary Supplements Websites**

**Food and Drug Administration** http://www.cfsan.fda.gov/~dms/supplmnt.html

**Federal Trade Commission** http://www.ftc.gov

http://www.ftc.gov/opa/1999/9911/astmetrx.htm

**US Air Force USAFSAM/AF** http://www.brooks.af.mil/web/af/altmed/HOMEFRAME.htm

**National Center for Complementary and Alternative Medicine** http://nccam.nih.gov

**American Botanical Council** www.herbalgram.org

Office of Dietary Supplements, National Institutes of Healthhttp://dietary-supplements.info.nih.gov

U.S. Uniformed Health Services: Human Performance Lab, includes "Nutritional Ergogenic Agents: A Compendium for the Special Operations Command" "Navy Seal Nutrition Guide" & "Navy Seal Physical Fitness Guide" http://www.usuhs.mil/mim/hpl.html

Health World On-line www.healthy.net

Consumer Labs http://www.consumerlab.com

Health and Nutrition Websites

American Heart Association http://www.americanheart.org

American Dietetics Association http://www.eatright.org

Calorie Control Council http://www.caloriecontrol.org/

Shape Up America http://www.shapeup.org/

American Diabetes Association http://www.diabetes.org

The Mayo Clinic Health Oasis http://www.mayohealth.org

Weight Information Network

National Institute of Diabetes, Digestive, & Kidney Diseases http://www.niddk.nih.gov/

Soy Foods Web Site www.soyfoods.com/

National Heart, Lung, and Blood Institute: Information Center www.nhlbi.nih.gov/nhlbi/nhlbi.htm

Federal Trade Commission www.ftc.org

Gatorade Sports Science Exchange www.gssi.web.org

Sportscience News www.sportsci.org

U.S. Department of Agriculture Food and Nutrition Information Center http://www.nal.usda.gov/fnic/

International Food Information Council http://ificinfo.health.org/

Wheat Foods Council http://www.wheatfoods.org/

Navy Environmental Health Center http://www-nehc.med.navy.mil/hp/index.htm

University of California Berkeley Wellness Letter http://www.berkeleywellness.com/

**Tufts University Nutrition Navigator** http://navigator.tufts.edu/